NRO APPROVED FOR RELEASE 17 September 2011

~~TOP SECRET~~ [redacted] Requirement for a System

CORONA/GAMBIT/LANYARD

HANDLE VIA BYEMAN-TALENT/KEYHOLE-COMINT CONTROL SYSTEMS JOINTLY

Copy No. [illegible] of 75

BYE-4590-64

[redacted]

Approved by USIB-D-41.13/12 attached

N FILE NO. 1.11.2

USIB-D-41.13/11
(COMOR-D-13/16)
27 July 1964
Limited Distribution

UNITED STATES INTELLIGENCE BOARD

MEMORANDUM FOR THE UNITED STATES INTELLIGENCE BOARD

SUBJECT : Long-Range Requirements for Satellite Photographic Collection

REFERENCE : USIB-D-41.13/10 (COMOR-D-13/14) 24 July 1964, Limited Distribution

1. The enclosed report on the subject from the Committee on Overhead Reconnaissance (COMOR), in response to USIB action in Executive Session at its 22 July meeting as recorded in the reference, is transmitted herewith for consideration by the Board of the COMOR Conclusions and Recommendations contained in Tab B hereto, pages 6 through 10.

2. The National Photographic Interpretation Center (NPIC) study attached as Tab c hereto is being distributed in a limited number of copies primarily to USIB Members and Observers.

3. The enclosed COMOR report is scheduled for consideration by the USIB at its meeting on 29 July 1964.

James S. Lay, Jr.

JAMES S. LAY, JR.
Executive Secretary

Attachment with
Tab A
Tab B
Tab C (TCS-7473-64)

HANDLE VIA BYEMAN-TALENT/KEYHOLE COMINT CONTROL SYSTEMS JOINTLY

LANYARD
CORONA/GAMBIT
~~TOP SECRET~~

GROUP 1
Excluded from automatic downgrading and declassification

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~~TOP SECRET~~

Handle via BYEMAN,
TALENT-KEYHOLE
Controls

CORONA/GAMBIT/LANYARD

Attachment
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UNITED STATES INTELLIGENCE BOARD

MEMORANDUM FOR THE UNITED STATES INTELLIGENCE BOARD

SUBJECT: Long-Range Requirements for Satellite Photographic Collection

REFERENCE: USIB-D-41.13/10 (COMOR-D-13/14)

1. This report is in response to the assignment by the Board at its Executive Session, meeting of 22 July, and seeks to respond directly to the Chairman's directive to COMOR set forth as an attachment to the referenced document. For the convenience of the Board in studying this report, that attachment is set forth as Tab A.

2. In pursuing its assignment, COMOR took into account its knowledge of the nature and mode of operation of the present KH-4 and KH-7 systems and the results obtained therefrom, comments of the NRO on the prospects of improvements to these systems, a briefing by CIA on a proposal for a search system with area coverage approximating KH-4 and resolution approximating KH-7, and a briefing by the NRO on

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G-3 and LANYARD. It had available, of course, the papers on the same subject submitted to the Board in April 1963 but on which there had not been a conclusion by the Board. NRO and the NPIC representatives participated fully in the discussions.

3. In direct response to the Board's assignment, the COMOR specified to NPIC the essential elements of information on major problems with a request that the NPIC, using the resources of all of the agencies participating in NPIC, advise on the extent to which the EEI could be met by photography with a capability of resolution to permit interpretation objects ten feet, three feet, [redacted] The results of this study are submitted at Tab C.

4. The conclusions which COMOR has reached as a result of its examination of the problems presented in our assignment are expressed in Tab B.

James Q. Reber
Chairman
Committee on Overhead Reconnaissance

Attachments (3)
Tab A
Tab B
Tab C

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Tab A

Directive to COMOR Regarding Long-Term Intelligence Requirements for Satellite Photographic Reconnaissance

1. COMOR is directed to provide for the Board's consideration at its 29 July meeting recommendations for future intelligence requirements for satellite photographic reconnaissance from the standpoint of required input to the intelligence inventory. In preparing its report, COMOR should take into account the experience achieved thus far through the use of the KH-7 and KH-4 configurations and an analysis by NPIC on the extent to which specified Essential Elements of Information can be met by improved resolution and quality of photography.

2. The COMOR deliberations and report should be concerned with the needs from an intelligence viewpoint of improved resolution in the GAMBIT spotting system, the advantages and disadvantages of a very much higher resolution in the spotting system even though the area coverage is reduced, the ability of the present and contemplated spotting systems to cover targets of interest with due consideration to accuracy of pointing and the ability to cover successive targets because of time involved in the roll and pointing of the camera.

3. Recommendations will be expected on the advantages of improvements to the present GAMBIT system considered feasible with further research and development and also advantages to be gained from further improvement in the existing CORONA system.

4. The importance of the development of a search system with area coverage approximating the CORONA (KH-4) but with resolution equaling the GAMBIT (KH-7) should be examined from the standpoint of the value of the input of Essential Elements of Information to the intelligence inventory resulting from such a development.

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Tab A Contd

5. Finally, consideration should be given to the need for an interim search system built around the LANYARD cameras which might produce resolution considerably better than the KH-4 but not as good as the KH-7 and which could be available long in advance of any of the proposed systems.

6. Although there is no indication that budget restrictions or technical or physical resources would necessarily foreclose concurrent action in several of the areas mentioned above, USIB would be interested in COMOR's views on the relative importance and hence the priorities which might be attached to the several courses of action indicated.

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Tab B

CONCLUSIONS

1. Intelligence requirements for search and surveillance necessitate a satellite photographic capability or capabilities for complete area coverage of the Sino-Soviet Bloc with a resolution which will permit interpretation of objects between three and four feet on a side.

2. There is also a requirement for photography which will permit interpretation of details on the order of [redacted] on a side on a number of targets.

3. There are many advantages and we believe no disadvantages from the point of view of photo interpretation or analytic usefulness in a satellite photographic system which would have continuous stereoscopic ground coverage equivalent to KH-4 and resolution equivalent to KH-7.

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4. There would also be advantages in a system with the capability to permit interpretation of details [redacted] on a side even with a swath width approximately half that of KH-7. Such resolution would provide valuable increments to our intelligence inventory. Although the number of targets for which such a system would be required in terms of vital importance is relatively small, the ability of such a system to also provide additional information on less critical targets could be an over-all important bonus.

5. Improvements are perhaps possible in KH-4 and KH-7 resolution--at best a reduction in the KH-4 from ten to nine feet and in the KH-7 from three to two feet. Improvement should be made in these systems, as well as in their reliability, without impeding development of the systems discussed in paragraph 7.

6. Because of its relatively narrow swath width (about 50 miles) and non-contiguous stereo coverage, the LANYARD System

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(KH-6), of which there are five packages available, could not be usefully employed as a substitute for KH-4; nor, since it has an estimated five-foot on a side resolution, could it be employed as a substitute for KH-7. COMOR has concluded that the KH-7 should be used in lieu of the KH-4 as a crisis satellite. However, before submitting its recommendation to the Board, COMOR has requested comments from the NRO and the NIC. In view of the fact that we are advised that the five LANYARD packages can be reinstituted and placed on standby as a crisis satellite without interference with the developments recommended in paragraph 7 below, we recommend the consideration of LANYARD for this purpose. In that case, there might eventually be on standby for a crisis both a KH-7 and a LANYARD, which in certain circumstances would be extremely desirable.

7. Recommendations on New Systems:

a. That developmental work should proceed urgently toward the achievement of

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(1) A single capability for search and surveillance with a continuous stereoscopic ground coverage equivalent to KH-4 and a resolution equivalent to KH-7; and

(2) A capability which will permit interpretation of details on the order [redacted] on a side even with a swath width approximately half that of KH-7.

b. That, if a priority of development must be established, the second should have first priority. (COMOR believes that in view of the existence today of a search and surveillance capability in the form of KH-4 and KH-7, the most urgent need is to develop a collection capability to fill the coverage gap in the high-resolution area, [redacted]

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*The CIA recommends that the first capability should have priority over the second. For the following reasons: a., A high-resolution system

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(three feet at nadir) which gives continuous, stereoptic coverage of a strip some 300 miles wide would appear to have substantially greater advantages from an over-all intelligence point of view over a very high resolution system [redacted] which CIA believes is seriously limited by the very narrow swath width and by the difficulty of achieving the necessary, extremely high pointing accuracy; and

b., Based on CIA's analysis of several major weapons systems and nuclear materials installations, photographs with a ground resolution of about three feet are adequate to determine existence and identity, and to provide in most cases the data upon which capacity/capability can be estimated.

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Tab C

Ground Resolution Comparison by NPIC
(see attached)

1. The Board requested that COMOR's study take into account an analysis by NPIC on the extent to which the specified Essential Elements of Information (EEI) can be met by improved resolution and quality of photography. COMOR accordingly arranged for a CIA study on this question to be subjected to amplification of the EEIs by DIA and evaluation of target data at three different ground resolutions by joint teams of DIA and CIA photo interpreters. Within the limits of the time permitted, such amplification of the EEI was made and the above task force at NPIC sought to complete its evaluation. Pages 1 through 9 have been fully coordinated insofar as these evaluations are concerned. Pages 10 through 17 have not for lack of time been fully coordinated.

2. The Director, NPIC has given as his opinion that differences between the CIA study and the joint evaluation are probably not significant. He observes that, for the most part, they are differences in precise interpretation or small variances in probability. This judgment was presumably based on pages 1 through 9.

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Tab C Contd

3. It was the consensus of COMOR that the column headed "Alternative, Possibly Better, Sources," should be omitted at this time. It was agreed that this column as presented is incomplete, particularly as to SIGINT contributions, and would nevertheless be thoroughly meaningful only if it contained alternative sources which could be weighed against a "yes" or "partially" in the [redacted] column. It would also only be important should the answers in the ten-foot column and three-foot column have been "no" or "partially." It would be necessary to specify that such obvious alternatives as obtaining the article in question, obtaining an operations manual, or suborning a technical expert involved in the design of the article must be ruled out. Furthermore, to permit a proper weighting of the need for such detailed photography, the entry in the "Alternative Source" column should be specific as to the type and value of the various elements of information which could be obtained on the one hand by high-resolution photography and on the other by the alternative source.

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Legend

Yes - Task can be accomplished
Partially - Task partially accomplished
? - Some possibility task can be accomplished
No - Task impossible
* - Elements of information added by DIAAP-1

General Indication of Intelligence Information Obtainable Relative to Ground Resolution of Camera Systems

Information Sought	10'	3'	[redacted]	Alternative, possibly better sources	Remarks
A. ICBM-MRBM/IRBM System					
Identify launch complex	yes				
* Area search	yes				
* Identify launch & support facility	yes				
Basing					
Hard or soft launch	yes				
If soft - how missile prepared and erected for launch	?	?	?		If gross features are to be considered Dependant upon amount of detail requested
If hard - determination of hardness based on:					
- Thickness of silo door			partially		
- Thickness of walls			partially		
- Extent "rattle space"			partially		

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FEASIBLE VIA TALENT-KEYHOLE-COMINT CONTROL SYSTEMS JOINTLY

Information Sought	10'	3'	[redacted]	Alternative, possibly better sources	Remarks
- Suspension system			?		Depends on timing and angle of photography
Type launch (fly out or lift out)			partially		"
*Periodic phases of site construction	partially	yes			General stages of construction (early, mid, late) identifiable on 10'
* Identification of ambiguous support facilities (i.e., missile/space)	partially	?	?		Complete answer requires other information
· Identification of weapons system employed	partially	partially	partially		
* Refire capability- Quantity of support facilities and additional missile storage on or near launch sites		?	?		
Location of nuclear warhead storage	partially	yes	yes		

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HANDLE VIA TALENT-KEYHOLE-
COMINT CONTROL SYSTEMS JOINTLY

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Information Sought	10'	3'	[redacted]	Alternative possibly better sources	Remarks
Technical Characteristics of Missile					
Liquid or solid fuel	partially	partially	partially		
If liquid, types of propellent		no	?		
Number of engines			?		
Guidance, whether all-inertial or radio-inertial	partially	partially	partially		
If radio-inertial, how functions		no	?		
Dimensions of missile:					
- Length		partially	yes		
Diameter at base			partially		
Number of stages			partially		If defined on missile
- Sizing of nose cone (RV)			?		

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HANDLE VIA TALENT-KEYHOLE-
COMINT CONTROL SYSTEMS JOINTLY

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TCS-7473-64

Information Sought	10'	3'	[redacted]	Alternativn, possibly Better sources	Remarks
B. ABM/SAM Systems					
Locate/identify ABM facility/ complex *and security measures	yes			Ground photography	If signature is known Security measures provide problems at 10'
pport areas & facilities & equipment ABM & SAM	partially	yes			Equipt. may not be seen at 10'
Electronics					
- Frequency of radar	no	no	?		
- Dimensions of associated radars and other sensors	..?	partially	yes		Depends on size of radar associated with system
- Dimensions of wave guide	no	no	?		
- Interrelationships between element facilities of ABM complex *testing areas nd oprnl.sites	partially	yes	yes		
- Power input to major radars	partially	partially	partially		Externally supplied power to site only
Weapons					
- Launcher mechanism/mode of launch	no	partially	yes		Mode of launch partially on 10'
Characteristics ABM/SAM					
- Dim[illegible]s	?	partia[illegible]	yes		Dependent [illegible]

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Information Sought	10'	3'	[redacted]	Alternative, possibly better sources	Remarks
Characteristics AM4 (continued)					
Fuel	?	?	?		
Type guidance	no	partially	partially		
* Missile Ranges (Facilities					
* Layout and Transportation	yes	yes	yes		
* Support Buildings	yes	yes	yes		
* Pad Configuration	yes	yes	yes		
* Missile Configuration	no	partially	yes		This will not permit detailed S&T analysis
Launch Systems	partially	yes	yes		
Type Guidance	no	no	?		
* Electronics Instrumentation Layout	yes	yes	yes		
* Electronic Instrumentation Components	no	no	partially		Uncertain meaning

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HANDLE VIA TALENT-KEYHOLE-
COMINT CONTROL SYSTEMS JOINTLY

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Information Sought	10'	3'	[redacted]	Alternative, possibly better sources	Remarks
Submarines					
- Sub base location	yes	yes	yes		
* Sub base function	?	yes			
Sub deployment dispersed	?			COMINT	
- Sub type identification	?	partially	yes		Under optimum conditions
- Length	?	yes			
- Width	?	yes			
- Dimension of sail	no	?	yes		
* Missile Dimensions (Hatch)	no	partially	yes	Low altitude aerial photography	
* Hull Construction	no	?	yes	Ground photography	
* Communications Facilities	no	no	yes	"	Only under optimum conditions at [redacted]
* Naval Missile Support Facilities					
* Location	yes				
* Function (i.e., ballistic or cruise missile support)	no	?	yes	Low altitude aerial photography	Pass at 3' if missile or handling equip. observed

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Information Sought	10'	3'	[redacted]	Alternative, possibly better sources	Remarks
D. Nuclear Energy Production					
- Identification of major production facility	yes	yes	yes		
- Production layout	partially	yes	yes		
- Overall power consumption	partially	yes	yes		
- Power consumption by section	no	no	?		
- Chemical processing facilities	?	partially	yes		
- Hot water effluence	partially	partially	partially		
- Metal and similar production	partially	partially	yes		
- Number of reactors	partially	partially	partially		
- Production rate of weapons	?	?	?		
- Stockpile procedures	partially	partially	partially		
- Storage capacity	partially	partially	partially		
Nuclear Testing					
- Test site identification	partially	partially	partially		

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HANDLE VIA TALENT-KEYHOLE-COMINT CONTROL SYSTEMS JOINTLY

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[illegible]-7673-64

Information Sought	10'	3'	[redacted]	Alternative, possibly better sources	Remarks
- Activity levels	yes	yes	yes		
- Weapon yields	partially	partially	partially		
- Test objectives	partially	partially	partially		

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HANDLE VIA TALENT-KEYHOLE-

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Information Sought	10'	3'	[redacted]	Alternative, possibly better sources	Remarks
B. Other Systems					
1. Aircraft					
Bases					
- Location/presence of aircraft	yes	yes			
- Fueling capacity	yes				If large storage tanks above ground
Identification of Aircraft					
-By Class (Fighter Bomber)	yes				
-By type (Beagle Badger)	?	yes			Large aircraft
-By model	no	?	partially		
Characteristics of Aircraft					
-Range based on size	no	no	?		
-Speed based on engine sizing and design	no	no	?		Give optimum conditions at [redacted]

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HANDLE VIA TALENT-KEYHOLE-
COMINT CONTROL SYSTEMS JOINTLY

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TOB-7473-64

Information Sought	10'	3'	[redacted]	Alternative	Remarks
* Weapon Storage					
* Nuclear - Location	yes				
Capacity	no	yes			If observed during construction
Hardness	no	yes	yes		
* ASM - Location	yes				
Number and Type	no	yes			
* AAM - Location	yes				
Capacity	no	yes			
Type	no	no	yes		If observed during construction
* Conventional - Location	yes				
Capacity	no	yes			
* Maintenance Support Facilities					
Location	yes				
Function & Capacity	partially	yes			
* Communication and Navigation Facilities	partially	yes			Major Facilities only

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HANDLE VIA TALENT-KEYHOLE-

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Information Sought	10'	3'	[redacted]	Alternative, possibly better sources	Remarks
F. Electronic and Communications					
Radar and Commo locations	yes				
Radar Design Determination	?	partially	yes		
Commo type identification	?	?	?		
Mobility Status	yes				
G. Missile Production					
* Identification of Production Facility	partially	partially	yes		Can be ident., but product must be seen to ident as missile production
* Production Layout	partially	yes			
* Product Identification	?	?	yes		Depends on size and type of missile
* Assoc. Test Facilities	partially	partially	yes		Large vert. stands visible at 10'
* Testing Activity	partially	partially	yes		Blast marks visible at 10'
*Research and Development Facilities	partially	partially	partially		
* Testing Activity	partially	partially	yes		

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Information Sought	10'	3'	[redacted]	Alternative	Remarks
H. *Aircraft Production					
*Identification of Production Facility	Yes				
*Production Layout	Yes				
*Product Identification	Yes				If product is engines only 3' req.
*Testing Facilities (Static)	Yes				
*Flight Test Facilities (ident)	Yes				
*Test Vehicle	Yes				If product is engines only 3' req.
*Research & Development Facilities	?	?	?	Other collateral	Can look any other engineering bldg
*Test Cells (Engines)	Yes				
*Test Cells (environment)	?	?	?	Other collateral	Poss assoc features could assist ident.
I. *CW Production					
*Production Facilities	No	No	No	Other collateral	
*Storage	No	?	Partially	Other collateral	
*Test Ranges	?	Partially	Partially		
J. *EW Production					
*Production	No	No	No	Other collateral	Assoc features may allow "suspect" ident.
*Storage	No	No	No		
*Test Ranges	?	Partially	Partially		

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HANDLE VIA TALENT-KEYHOLE-
TYPE CONTROL SYSTEMS JOINTLY

Information Sought	10'	3'	[redacted]	Alternative	Remarks
Ground Forces					
Locations of Installations	Yes				
*Mensuration of Bldgs	Yes				
*Location of Training Areas	Yes				
*Mensuration of Firing Ranges	Yes	Yes			
Type of Major Equipment	No	Yes			
O/B Identification of Unit by Type and Echelon	No	Yes	Yes		
*Level of Activity in Installations	Partially	Partially	Yes		
*Level of Activity in Training Areas	Partially	Partially	Yes		
Locations of Reserves & Support	No	Yes			
*Major Material Depots					
*Identification of Installation	No	?	Yes		
*Facility Layout	Yes				
*Product Identification	No	Partially	Yes		

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HANDLE VIA TALENT-KEYHOLE-

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Information Sought	10'	3'	[redacted]	Alternative	Remarks
H. *Submarine and Other Naval Ship Production					
*Identification of Prod. Facility	Yes				
*Production Layout	Yes				
*Production Identification	Yes				
*Propulsion Equip. Prod.	?	?	?		
*Product Identification	?	?	?		
M. *Ground & Naval Armament Prod.					
*Identification of Prod. Facility	?	?		Partially	
*Production Layout	?	Yes		Yes	
*Product Identification	No	?		?	
*Research & Development Facilities	Yes				
*Testing Activity	Partially	Yes			

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Information Sought	10'	3'	[redacted]	Alternative	Remarks
9. *Inland Waterways					
*Locks	Partially	Yes			Gate dimensions
*Dams	Yes				
*Craft	Partially	Yes			
*Wharves	Yes				
*Storage (Open & Covered)	Partially	Yes			
*POL	Partially	Yes			
*Overpasses	Partially	Yes			
*Chanals & Channels	Partially	Partially	Yes		
*Mechanical Handling Facilities	No	Yes			
*Clearance (Rail & Road)	Yes				
*Ship Repair Facilities	Partially	Yes			

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PACKAGE VIA MARKET-KEYHOLE-
COMMAND CONTROL SYSTEMS JOINTLY

[redacted]

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Information Sought	10'	3'	[redacted]	Alternative	Remarks
P. *Ports					
*Wharves	Yes				
*Warehouses	Partially	Yes			
*POL Storage Facilities	Partially	Yes			
*Ship Repair Facilities	Partially	Yes			
*Mechanical Handling Facilities	No	Yes			
*Rail & Road Clearance from Wharves	Partially	Yes			
*Harbor Craft	Partially	Yes			
*Breakwaters and Jetties	Yes				
Q. *Railways					
*Bridges	Partially	Yes			
*Yards	Partially	Yes			
*Shops	Partially	Yes			
*Passing Track	No	Yes			
*Trackage	Partially	Yes			
*Motive Power	No	Yes			
*Freight Cars	No	Yes			
*Passenger Cars	No	Yes			
*Tunnels	Partial	Yes			

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Information Sought	10'	3'	[redacted]	Alternative	Remarks
R. *Highways					
*Roadway Surface (Including shoulders)	No	?	Yes		
*Drainage Facilities (Ditches, culverts, etc.)	No	Partial	Yes		
*Bridges	Partially	Yes	Yes		Structural dimensions for capacity and vulnerability
*Defiles	Yes				
*Ferrys	Partially	Yes			
*Tunnels	Partially	Yes			